

Large-Area, Multi-Junction, Epitaxial Lift-Off Solar Cells with Backside Contacts, Phase II

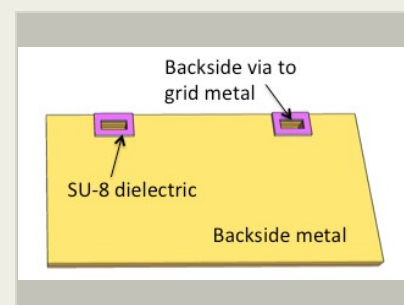
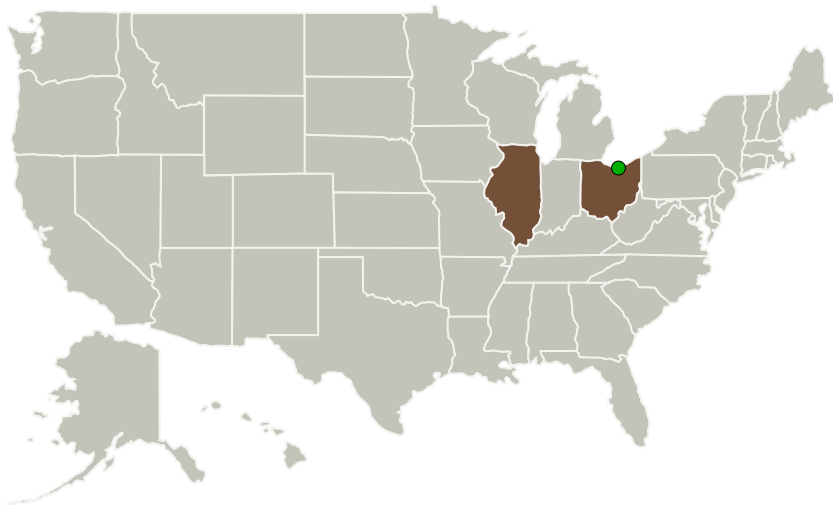
Completed Technology Project (2016 - 2019)



Project Introduction

In this Phase II program we propose to develop a manufacturable production process to introduce backside contacts to MicroLink Devices' large-area, multi-junction epitaxial lift-off (ELO) solar cells. We will also develop new assembly processes to fabricate flexible Kapton sheets with backside contact ELO solar cells. This enables an important path for cost reduction using fully automated laydown and interconnect of solar panels. The new backside contact ELO solar cell technology has potential benefits for future NASA solar electric propulsion (SEP) programs using very large solar cell arrays. Backside contacts are used in the highest efficiency silicon solar cells manufactured by SunPower (>24% efficiency in production) but have never been successfully applied commercially to multi-junction solar cells. Benefits for large-area space solar cell include: higher device efficiency by reducing topside grid shadow and resistive losses, new approaches for panel assembly by placing contacts on backside of solar cell, and reduced arcing in high-voltage arrays by eliminating topside interconnects. The proposed technology builds on MicroLink Devices' low-cost, lightweight ELO solar cell technology and previous experience with backside contact solar cells for CPV applications.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
MicroLink Devices, Inc.	Lead Organization	Industry Minority-Owned Business	Niles, Illinois
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

Illinois	Ohio
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Project Transitions

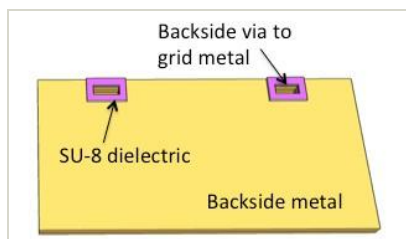
▶ **April 2016:** Project Start

✓ **April 2019:** Closed out

Closeout Documentation:

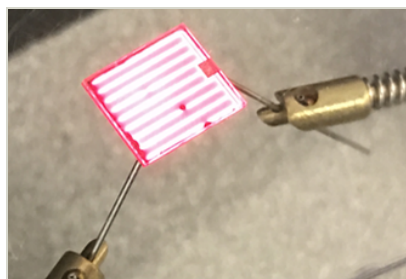
- Final Summary Chart(<https://techport.nasa.gov/file/139772>)

Images



Briefing Chart Image

Large-Area, Multi-Junction, Epitaxial Lift-Off Solar Cells with Backside Contacts, Phase II (<https://techport.nasa.gov/image/129925>)



Final Summary Chart Image

Large-Area, Multi-Junction, Epitaxial Lift-Off Solar Cells with Backside Contacts, Phase II (<https://techport.nasa.gov/image/128926>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

MicroLink Devices, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Christopher Youtsey

Co-Investigator:

Chris Youtsey

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Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.1 Photovoltaic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System